

Standard PS-5: The student will demonstrate an understanding of the nature of forces and motion.

Supporting Content Websites

Teachers Domain – Galileo: His Experiments

<http://www.teachersdomain.org/9-12/sci/phys/mfw/galileoexp/index.html>

Simulates dropping of two different masses.

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Teachers Domain – Galileo on the Moon

<http://www.teachersdomain.org/9-12/sci/phys/mfw/galmoon/index.html>

Shows video of a hammer and a falcon feather being dropped on the moon.

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Teachers Domain – Galileo's Incline Plane

<http://www.teachersdomain.org/9-12/sci/phys/mfw/galileoplane/index.html>

Shows video of a replica of Galileo's incline plane and his discover that the velocity is equal to the acceleration multiplied times the time elapsed and that the distance traveled is proportional to the square of the time elapsed. Interesting science research work by Galileo (even though the mathematics is more than what is needed for Physical Science).

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Montana State University, Bozeman – Conceptual Astronomy and Physics Education Research Team – Welcome to the Student Difficulties in Physics Information Center

<http://www.physics.montana.edu/physed/misconceptions/index.html>

Discusses common misconceptions students have in physics, describes specific misconceptions and cites research. Good teacher reference.

PS-5.1,6

Glenbrook, IL Public Schools, The Physics Classroom – Describing Motion with Position vs. Time Graphs

<http://www.glenbrook.k12.il.us/gbssci/phys/Class/1DKin/U1L3a.html>

Gives summaries on interpreting one dimensional position vs. time graphs.

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The Physics Classroom – One Dimensional Kinematics

<http://www.physicsclassroom.com/mmedia/kinema/cnv.html>

Observe an object moving to the left while graphs are created that show Position-Time, Velocity-Time, and Acceleration-Time.

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Suggested Literature

William Robertson, Ph.D, *Stop Faking It! Force & Motion*, NSTA press, 2002

Book guides the teacher (and/or student) to common understandings about the basics of force and motion. There are easy-to-understand explanations with activities using

commonly found equipment. The book will lead the reader through Newton's laws and gravity explanations with concrete examples, clear language, and diagrams.

Robert Gardner. *Experiments with Motion*, Enslow, 1995.

Easy-to-do experiments better illustrate the text and allow a student to understand Newton's Laws of Motion and their application to space flight as well as to the movement of animals and vehicles. Diagrams, explicit lists of materials needed, answers to puzzles, and a bibliography contribute to the usefulness of this work.

Robert W. Wood. *Mechanics Fundamentals*, Learning Triangle Press/McGraw-Hill, 1996.

Important principles of physics, specifically relating to the effect of forces on objects at rest or in motion, are explained through the simple-to-perform experiments in this book. Line drawings illustrate all experiments and a glossary explains new terms.

Suggested Data Streaming Video

Science Investigations Physical Science: Investigating Motion, Forces and Energy

2004 Discovery Channel School

Several segments focus on the ways different forces affect motion.

Speed and Acceleration

9:05

PS-5.1-4

Physics of Roller Coaster Forces

4:37

PS-5.7, PS-5.5

Basics of Physics: Exploring Laws of Motion

Program focuses on Newton's Three Laws – examples help the understanding of inertia, force/mass/acceleration, and actions/reactions.

21:16

PS-5.7

Basics of Physics: Exploring Gravity

1993 United Learning

Program explores gravity through demonstration and activities.

16:20

PS-5.5, PS-5.10

Career Connections

Road Traffic Accident Investigator

Mechanical Engineer

Civil Engineer